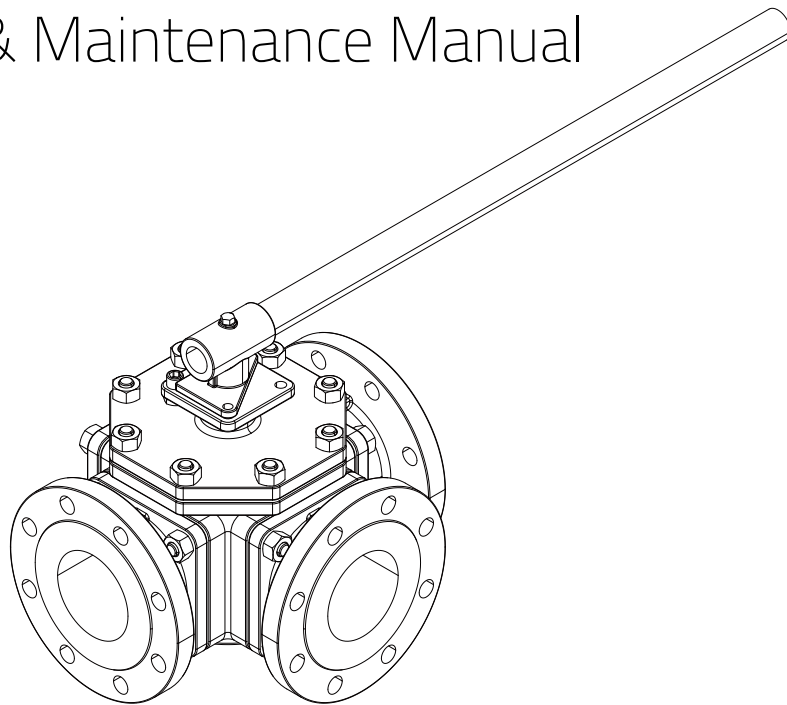


# Direct Mount 4-Seated 3-Way Flanged Ball Valve Series KHD-M4F(a)

Installation, Operation,  
& Maintenance Manual



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## Chapter I Introduction

The manual is provided to ensure proper installation, operation & maintenance for Series M4F(a) Direct Mount 4-Seated 3-Way Flanged Ball Valve, manufactured and supplied by KLINGER DIE ERSTE Industry Co., Ltd. The valves are identified by marking on the body or on a name plate or both.

### 1.1 Contact Information

For information concerning warranties, or for questions pertaining to installation, operation or maintenance of KLINGER DIE ERSTE products, contact:

KLINGER DIE ERSTE INDUSTRY CO., LTD.  
5F-1, No.936, Sec. 4, Wen-Xin Road,  
Taichung City, Taiwan 406

Phone: +886 4 22310059  
Fax: +886 4 22360236  
Email: sales@die-erste.com

To order replacement parts, contact KLINGER DIE ERSTE sales at address listed above.

### 1.2 General Notes

The following instructions refer to Series M4F(a) Direct Mount 4-Seated 3-Way Flanged Ball Valve as described in the KLINGER DIE ERSTE current catalog.

Keep the protective covers in place until the valve is ready for installation. Valve performance depends upon prevention of damage to ball surface. After removing the cover make sure that the valve is completely open and free of obstructions, dirt, particles or any materials that may cause seat or seal damage.

Valves may contain a silicon-based lubricant for transportation, which aids in the assembly of the valve. Lubricant may be removed with a solvent if found objectionable. Alternatively valves can be ordered free of lubricants upon request.

Certain ferrous valves contain phosphate material, and are oil dipped during the course of manufacture. However, the processes used are completely non-toxic.

### 1.3 Precautions and Warnings

Choose the correct material of valve for different applications before obtaining the valve. The user should be aware of the operating situation, fluid properties, and the possible outcomes when implementing valves into the pipeline system. KLINGER DIE ERSTE suggests that the user should make estimation beforehand.

Fluid undergoes property changes with respect to outside factors, particularly fluid left inside the sealed cavity. When temperature and pressure exceed allowable value, valve failure may occur.

The Series M4F(a) Direct Mount 4-Seated Flanged 3-Way Ball Valve are generally not recommend for throttling services, due to both fluid flow and ball leading edge may damage or deform the resilient ball seats, and consequently causing leakage problem. Further, high fluid velocity or the presence of solid particles in suspension will further reduce seat life in throttling applications.

Do not attempt to remove the bonnet from the body during operation, especially with the presence of high pressure in the pipeline system.

For safety concern, unstable fluid should not be used in the pipeline system, unless otherwise specified with the category III in Declaration of conformity.

#### CAUTION:

Before removing valve from pipeline, operator should be aware of that: media flowing through the valve may be corrosive, toxic, flammable, or of a contaminant nature. Where there is evidence of harmful fluids having flowed through the valve, the utmost care must be taken. It is suggested that the following safety precautions should be taken when handling valves.

- 1) Always wear eye shields.
- 2) Always wear gloves and footwear.
- 3) Wear protective headgear.
- 4) Ensure that running water is readily accessible.
- 5) Fire extinguisher must be obtainable if media is flammable.

**NOTE:**  
Actuators and accessories are only discussed briefly. Please refer to individual manuals for further information on their IOM manuals.

Check the line gauge to ensure that no pressure is present at the valve. Ensuring media is released by operating valve slowly to the half open position. Ideally, the valve should be decontaminated when the ball is in the half open position.

These valves, when installed, have body connectors which form an integral part of the pipeline and the valve cannot be removed from the pipeline without being dismantled.

### 1.4 Storage

If the valves are not to be installed immediately, please store the valve carefully before installation, preferably indoors in a dry and clean place. Also, the valve ports should be sealed by plastic caps to prevent dirt from entering and damaging inner parts.

**Note:**  
For the 3-way ball valve, do not keep the ball in partially open position for an extended period of time, since this could cause seat leakage.

## Chapter II Installation

Flush the pipeline carefully before installing the valve. The particles of dirt or debris or welding may damage the ball sealing surface and seats. Also, before installing, check all valve and mating flanges to ensure gasket surfaces are free from defects.

**CAUTION:**  
Do not exceed the valve performance limitation.

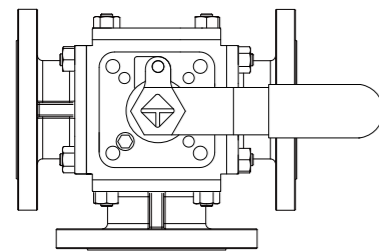
**CAUTION:**  
Before installing, make sure the line pressure has been relieved, and any hazardous fluids have been drained or purged from the system.

### 2.1 General Notes

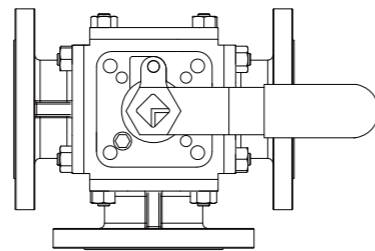
#### 1) Direction

User must define the preferred mounting orientation with respect to the system pressure. The marking on the top of stem and handle help to identify the upstream side (high pressure) and downstream side (low pressure).

**Note:**  
The pattern and flow direction of the ball will be exactly marked on the top of valve stem. The marking on the handle is ONLY for initial reference when receiving the goods. The user may change the installation of the handle, and invalidate the markings on the handle, resulting in erroneous flow control.



**Figure 2.1.2 The T-Port marking on the top of stem and initial installation of handle.**



**Figure 2.1.1 The L-Port marking on the top of stem and initial installation of handle.**

### 2) Position

The body, cap and gasket are in the connection area of ball valve and pipeline. The bear weight ability and gradient are very important to the pipe installation. Do not make the pressure from the pipeline, and stress to concentrate on the connecting area of body and cap. Ball, seat, and stem will be damaged. Consequently, deformation and leakage may occur.

**Note:**  
Considering the balanced force of the valve seat, DIE ERSTE recommends the use of a horizontal position when installing the 3-way ball valves which size < DN80 (3") to maximize sealing and reduce accumulation of particles.

### 3) Fittings

Select the correct size of fittings according to the pipeline specification. Mating the valve to the pipeline adequately with appropriate bolts. Do not attempt to correct pipeline misalignment by means of flanged bolting.

**Note:**  
Over tightening of any side may cause leakage.

### 4) Systems hydrostatic test

Before delivery, valves are tested 1.5 times the allowable pressure at ambient temperature in OPEN position. However, after installation, the piping system may subject to system tests, as condition not to exceed the marking pressure.

### 5) Pre-Installation Wash

Before the valve installation, clean the pipeline system to remove any foreign deposits by water. Clean the connecting flanged end surfaces as well to ensure tight sealing.

### 2.2 Installation of Flanged Ends

1. Before installing the valves, make sure the flanges and the pipe are free from grit, dirt or burrs.
2. The flanges must be aligned and parallel with the correct distance to allow the valve face-to-face dimension and gaskets to fit between.

3. Tighten the flange bolts in a crossover pattern, with a torque values determined by the gasket manufacturer, other variables like gasket type and material, bolt, flange and lubricant affect the tightening torque values.
4. Note that the bolts tightening must be uniform in order to create a parallel movement of the two flanges and uniform deformation of the gasket in between them.
5. Before pressure testing the valves, bring the valves to the half OPEN position to ensure pressure reaches the stem seals and to avoid unnecessary loading of the seats. Fail-to-close actuated valves should be brought to the half-OPEN position.

**NOTE:**  
Do not fasten supports to the flange bolting or the actuator.

### 2.3 Pneumatic and Electrical Connections

When installing the actuator, make sure that the valve-actuator combination functions properly. The flow direction is indicated by a slit at the top of valve stem. See Figure 2.2.

If possible, install the valve so that the actuator can be disconnected without removing the valve from the piping.

Please refer to the appropriate instruction manual shipped with the automation devices for the installed actuator, positioner, filter/regulator, solenoid, and/or limit switches.

When making pneumatic connections, it is recommended that PTFE tape or paste is used on threaded joints, unless otherwise specified by the components instruction manual. The pneumatic supply, such as dry air or nitrogen, should be clean. When making electrical connections, wiring of components should be in accordance with any and all applicable local and national codes and standards.

Before installing the actuator, use an adjustable wrench to manually rotate the valve stem several times. This rotation breaks the torque that may have built up during long-term storage.

## Chapter III Operation

To change the flow pattern of the valve, turn the handle  $\frac{1}{4}$  turn (90 degrees). When shipping, the default connection between the flow path and handle are shown in Figure 3.1. Please note that the change of stop pin and handle installation makes various flow control.

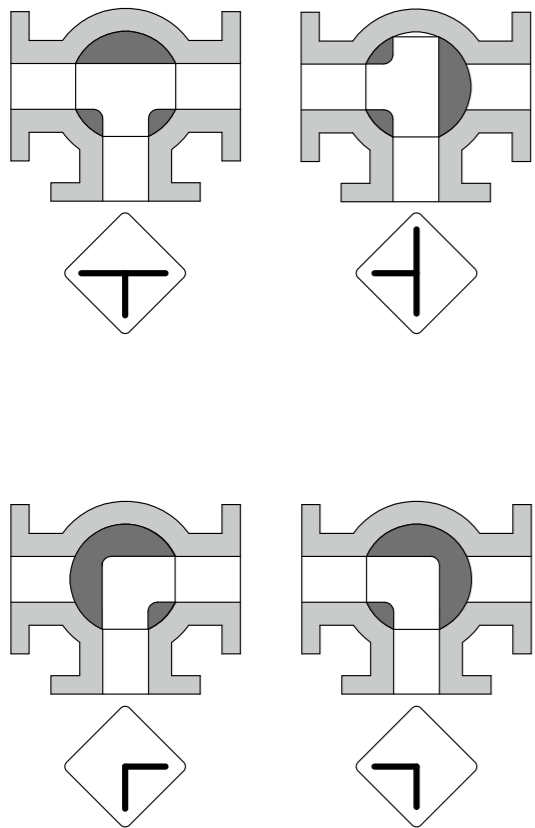


Figure 2.2 Top view of the valve: when the actuator is installed, the flow direction can be identified by the slit on the stem top.

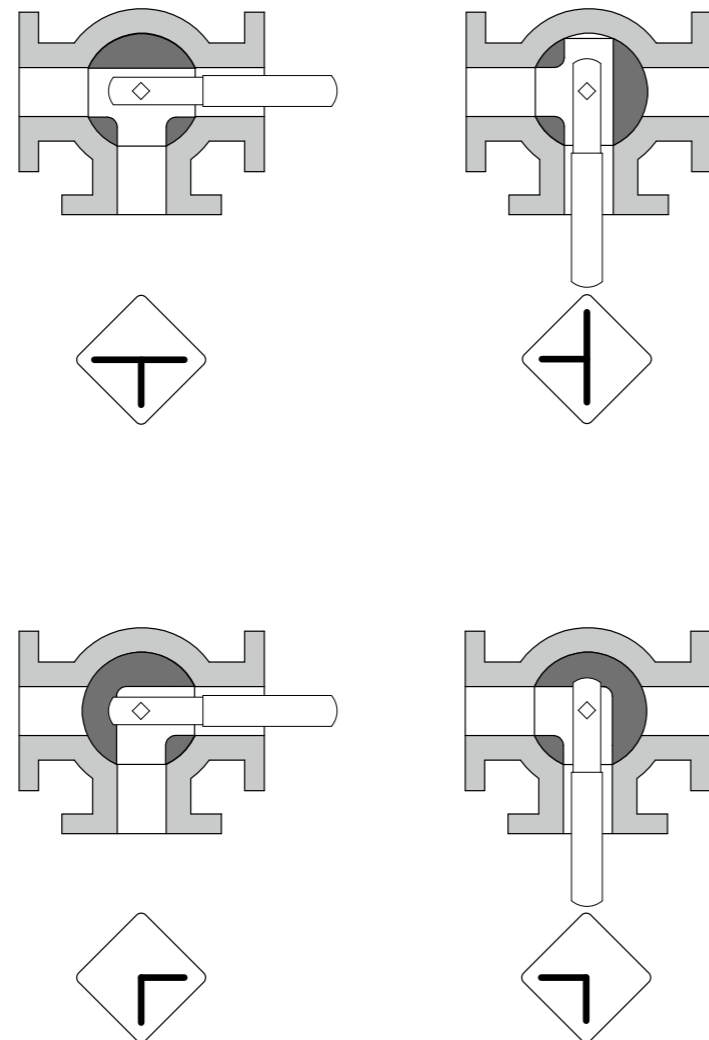


Figure 3.1 Default connection between the flow path and handle

**Note:**

Please re-correct the pattern of flow path on the handle when changing the connection between the handle and the stop pin. Wrong markings may cause users to make wrong operations and cause system damage.

### 3.1 Handling

During the ball valve installation, it must follow the procedure to handle at the both side of the bodies. If using cable for big size valve, make sure the cable must be strong enough to ensure the safety during the installation.

Never lift the valve package by the actuator, positioner, limit switch or their piping. The Valve damage or personal injury may occur from falling parts.

### 3.2 Cleaning

Even though the valves were transported under a clean environment, operator must check if there is any foreign body or dusts inside the bore. If yes, clean the valve before installation. Operator may clean the valves by water, compression air, or steam. However, valve automation devices shall be cleaned only with water or steam, using compression air to clean the valve automation devices is strictly prohibited. For cleaning operation, first step is put the valve bore perpendicular to the ground and clean, ensure all the dusts are removed from the bore. The second step is to check and clean all the connecting pipe bore and connection area. No flush, rust and foreign bodies are allowed to avoid the blocking and leakage.

### 3.3 Manual Operation

KLINGER DIE ERSTE Series M4F(a) Direct Mount 4-Seated 3-Way Flanged Ball Valves have  $\frac{1}{4}$  turn operation in a counter-clockwise direction to divert the flow.

**CAUTION:**

Do not use the valves at partially open position. Using partially opened valves may lead to seat deformation and leakage.



**CAUTION:**

Check and make sure that after the designated handle is tightened with adaptor bolts/nuts, operate the valve in a stable posture. If the handle is slid out, insufficient insertion of the handle and forcible operation may result in damage or injury.

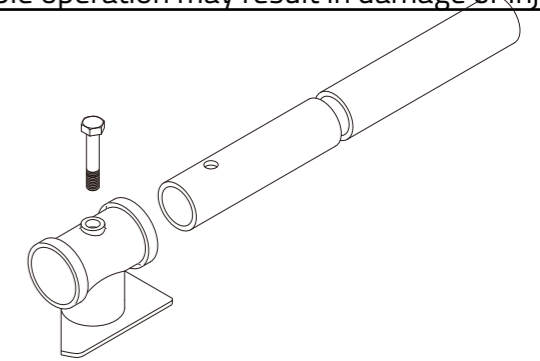


Figure 3.2 HANDLE HEAD BOLT

### 3.4 Remote Operation

Where manual operation is not required, valves may be automated for remote operation, instrument controls etc. KLINGER DIE ERSTE offers a wide range of pneumatic and electric actuators for different working conditions.

When an actuator is used, no stop plate is fitted to the valve since end stops are an integral part of the actuator. Operation will be in accordance with KLINGER DIE ERSTE Installation, Operation and Maintenance Instructions for the relevant actuator.

**CAUTION:**

Keep hands, other parts of the body, tool and other objects out of the open flow port. Leave no foreign object inside the pipeline. When the valve is actuated, the ball segment act as a cutting device. Also, the segment position may change when the valve is moved. The failure may result in damage or personal injury.

### 3.5 Technical Data

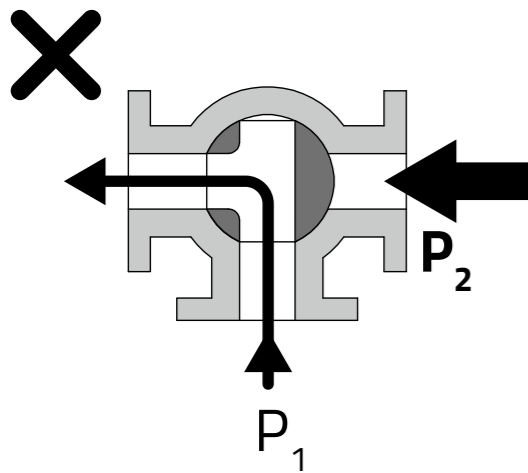
**Table 3.1 Break Torque at room temp**

Please refer to the data sheet of M4F(a) in KLINGER DIE ERSTE official website.

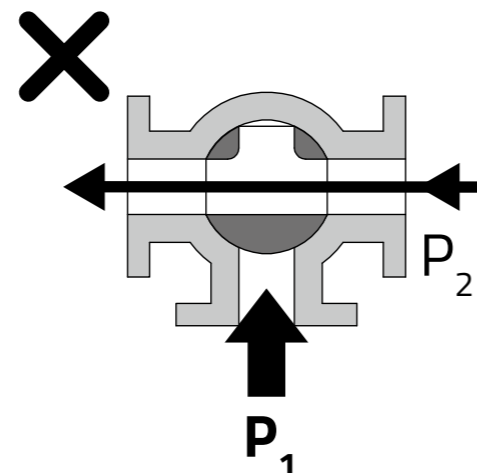


### 3.6 Limitation of Flow Direction

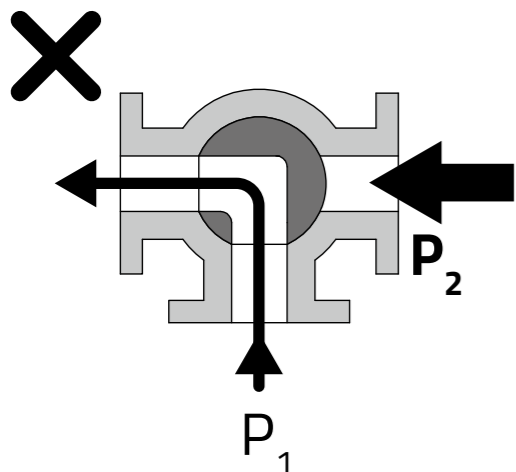
For Series M4F(a), the 3-way ball valve which sizes under DN65 or 2-1/2 inch is suitable for switching, dividing or mixing fluids instead of blocking due to its floating ball design. There is a limitation to the differential pressure between the pressure in central port (P1) and side port (P2). Users should pay attention to avoid the flow operation as the below figures to prevent leakage.



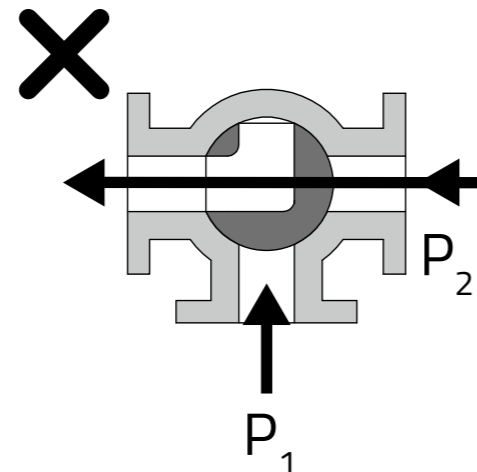
**Figure 2.3.1**  
For a T-Port 3 Way Ball Valve, when  $P_2 > P_1$ , leakage from Port 2 to Port 1 may occur.



**Figure 2.3.2**  
For a T-Port 3 Way Ball Valve, when  $P_1 > P_2$ , leakage from Port 1 to Port 2 may occur.



**Figure 2.3.3**  
For a L-Port 3 Way Ball Valve, when  $P_2 > P_1$ , leakage from Port 2 to Port 1 may occur.



**Figure 2.3.4**  
For a L-Port 3 Way Ball Valve, Whether it is  $P_2 > P_1$  or  $P_1 > P_2$ , Port 1 and Port 2 have the possibility of leaking with each other.

## Chapter IV: Maintenance

**CAUTION:**  
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized.

### 4.1 General Notes

With Self-wipe ball, seats, and pressure equalizing slots, KLINGER DIE ERSTE valves have a long, trouble-free life, and maintenance is seldom required. However, when necessary, valves may be refurbished, using a minimal number of components, none of which require machining. The valves are designed for easy service and assembly in the field.

Before maintenance, user should check availability of the service kits for Series M4F(a) Direct Mount 4-Seated 3-Way Flanged Ball Valve. We strongly recommend using the genuine service kit produced directly from the manufacture facility. For more information, please contact your KLINGER DIE ERSTE representatives. Service kits may be available locally; however, KLINGER DIE ERSTE is not responsible for any of the valve damage caused by using non-genuine spare parts.

### 4.2 Maintenance Frequency

The maintenance frequency is determined based upon the application of the valve. User should consider the following factors when determining the maintenance time interval: fluid type, flow velocity, operation frequency, pressure and temperature.

**Note:**  
For the Series M4F(a) Direct Mount 4-Seated 3-Way Flanged Ball Valve, we recommend inspecting the valve at least every (1) year.

**Note:**  
Please use the original spare parts to ensure the valve functions well.

**Note:** When sending back the valve to KLINGER DIE ERSTE for investigation, do not disassemble it. Clean the valve carefully and flush the valve internals. If possible, inform us about the medium used in the valve.

### 4.3 Disassembly

**CAUTION:**  
Pipeline and valve must be depressurized by shutting off the valve and bleed line, cycle the valve once and leave it half open to relieve the pressure from the body cavity.

**Note:**  
Series M4F(a) Direct Mount 4-Seated 3-Way Flanged Ball Valve according to the size, it can be divided into "floating ball with integral top cap design" and "trunnion ball with separated top cap design". The user must confirm the design form when disassembling or assembling to avoid unnecessary fails. Please see figures in Page 12 to Page 14.

Before attempting to remove the valve from the pipeline, please cycle the valve with the line pressure completely released to ensure that the pressure has also been released from the valve cavity.

- 1) For SIZE from DN15 to DN50 (1/2" to 2")
  1. Remove the HANDLE NUT (15), HANDLE (16), LOCKING PLATE (14), HANDLE WASHER (13), LOCK SADDLE (12).
  2. Loose the STEM NUT (11).
  3. Remove all CAP BOLTS (22) and END CAPS (2).
  4. Remove and discard the BALL SEATS (4) and CAP GASKETS (5).
  5. Support the BALL (3) to prevent it from falling out of the BODY (1).
  6. Remove the BALL (3) out of Body (1) and place it in a clean and safe area for reuse.
  7. Push the valve STEM (7) down from the BODY(1), and then remove it.
  8. Remove the STEM NUT (11), BELLEVILLE WASHER (10), GLAND (9) and STEM PACKINGS (8) from stuffing box and remove the O-RING (20) and THRUST WASHER (6) from the STEM (7).
  9. Taking care not to scratch the inside surface of stuffing box and surface of STEM (7). Clean the valve STEM (7) and stem hole area.

- 2) For SIZE from DN65 to DN100 (2-1/2" to 4")
  1. Remove the HANDLE HEAD (12).
  2. Remove all CAP NUTS (18) and END CAPS (2).

3. Remove and discard the BALL SEATS (5) and CAP GASKETS (6).
  4. Remove all BONNET NUTS (18). Push the stem of the TRUNNION BALL (3) down from the TOP BONNET (20), and leave the TRUNNION BALL (3) in the BODY (1). Finally remove the TOP BONNET (20) with the stem set and TOP BONNET GASKET (21).
  5. Remove the TRUNNION BALL (3) and BALL BUSHING (4) out of Body (1) and place them in a clean and safe area for reuse.
  6. Remove the GLAND PLATE(11), BELLEVILLE WASHER (10) and GLAND (9).
  7. Remove STEM PACKINGS (8) and remove the O-RING (7) from stuffing box.
  8. Taking care not to scratch the inside surface of stuffing box and surface of stem of TRUNNION BALL (3). Clean the TRUNNION BALL (3) and stem hole area.
- 3) For SIZE from DN125 to DN200 (5" to 8")
9. Remove the HANDLE HEAD (12). The WASHER (24) and STOP PLATE (23) can also be removed.
  10. Remove all CAP NUTS (18) and END CAPS (2).
  11. Remove and discard the BALL SEATS (5) and CAP GASKETS (6).
  12. Remove all BONNET NUTS (18). Push the stem of the TRUNNION BALL (3) down from the TOP BONNET (20), and leave the TRUNNION BALL (3) in the BODY (1). Finally remove the TOP BONNET (20) with the stem set and TOP BONNET GASKET (21).
  13. Remove the TRUNNION BALL (3) and BALL BUSHING (4) out of Body (1) and place them in a clean and safe area for reuse.
  14. Remove the GLAND BOLTS (22) and GLAND (11).
  15. Remove STEM PACKINGS (8) from stuffing box and remove the O-RING (7) a from the stem of TRUNNION BALL (3).
  16. Taking care not to scratch the inside surface of stuffing box and surface of stem of TRUNNION BALL (3). Clean the TRUNNION BALL (3) and stem hole area.

**Note:**  
Damaged internals to be replaced by DIE ERSTE repair kits only.

#### 4.4 Reassembly

Before reassembly, inspect the valve for any damage on body and all internals. Damaged internals can be replaced by genuine DIE ERSTE valve part from the service kit.

##### 1) For SIZE from DN15 to DN50 (1/2" to 2")

1. Lubricate the STEM (7), O-RING (20) and THRUST WASHER (6) with appropriate lubricant.
2. Place the Thrust Washer (6) and O-RING (20) on the STEM (7).
3. Insert the BLANK CAP (23) into the valve BODY (1) with BALL SEAT (4) and CAP GASKETS (5). Tighten CAP BOLTS (22) according to diagonal sequence.
4. Insert the STEM (7) horizontally into the bottom side of stuffing box and carefully guide it up through the stem bore.
5. Place the BALL (3) into the center BODY (1) according to the flow pattern until the stem tongue is engaged.
6. Insert the END CAP (2) opposite to the BLANK CAP (23) into the valve BODY (1) with BALL SEAT (4) and CAP GASKETS (5). Tighten CAP BOLTS (22) according to diagonal sequence.
7. Insert other END CAPS (2) into the valve BODY (1) with BALL SEAT (4) and CAP GASKETS (5). Tighten CAP BOLTS (22) according to diagonal sequence.
8. Insert the STEM PACKINGS (8) over the stem and into the stem bore. Place the GLAND (9), BELLEVILLE WAHSER (10) and tighten the STEM NUT (11).
9. Insert the LOCK SADDLE (12), HANDLE WASHER (13), LOCKING PLATE (14), and HANDLE (16), and then tighten the HANDLE NUT (15) to fix them.
10. Ensure smooth operation of valve during opening and closing.

##### 2) For SIZE from DN65 to DN100 (2-1/2" to 4")

1. Lubricate the stem of the TRUNNION BALL (3), O-RING (7) with appropriate lubricant.
2. Put the BALL BUSHING (4) on the bottom hole of the BODY (1) inside. Place the bottom TRUN-

- NION BALL (3) into the center BODY (1) aligning to BALL BUSHING (4). Then place the TOP BONNET (20) with the TOP BONNET GASKET (21).
3. Tighten BONNET NUTS (18) on TOP BONNET (20) according to diagonal sequence.
  4. Insert the BLANK CAP (16) and END CAPS (2) into the valve BODY (1) with BALL SEATS (5) and CAP GASKETS (6). And tighten CAP NUTS (18) on caps according to diagonal sequence.
  5. Insert the O-RING (7), STEM PACKINGS (8), GLAND (9), BELLEVILLE WASHER (10) over the stem and into the stem bore. Tighten the GLAND PLATE (11) onto TOP BONNET (20). Check if the stem set is fixed with the TOP BONNET (20).
  6. Adjust the orientation of the stem according to the right flow pattern.
  7. Insert the HANDLE HEAD (12) and tighten the HANDLE BOLT (14) to fix them.
  8. Ensure smooth operation of valve during opening and closing.

##### 3) For SIZE from DN125 to DN200 (5" to 8")

9. Lubricate the stem of the TRUNNION BALL (3), O-RING (7) with appropriate lubricant. Place the O-RING (20) on the stem.
10. Put the BALL BUSHING (4) on the bottom hole of the BODY (1) inside. Place the bottom TRUNNION BALL (3) into the center BODY (1) aligning to BALL BUSHING (4). Then place the TOP BONNET (20) with the TOP BONNET GASKET (21).
11. Tighten BONNET NUTS (18) on TOP BONNET (20) according to diagonal sequence.
12. Insert the BLANK CAP (16) and END CAPS (2) into the valve BODY (1) with BALL SEATS (5) and CAP GASKETS (6). And tighten CAP NUTS (18) on caps according to diagonal sequence.
13. Insert the STEM PACKINGS (8), GLAND (11), over the stem and into the stem bore. Tighten the GLAND BOLTS (22) onto GLAND (11) and TOP BONNET (20). Check if the stem set is fixed with the TOP BONNET (20).
14. Adjust the orientation of the stem according to the right flow pattern.
15. Insert the STOP PLATE (23), WASHER (24), HANDLE HEAD (12) and HANDLE (15).
16. Ensure smooth operation of valve during open-

ing and closing.

#### 4.5 Troubleshooting

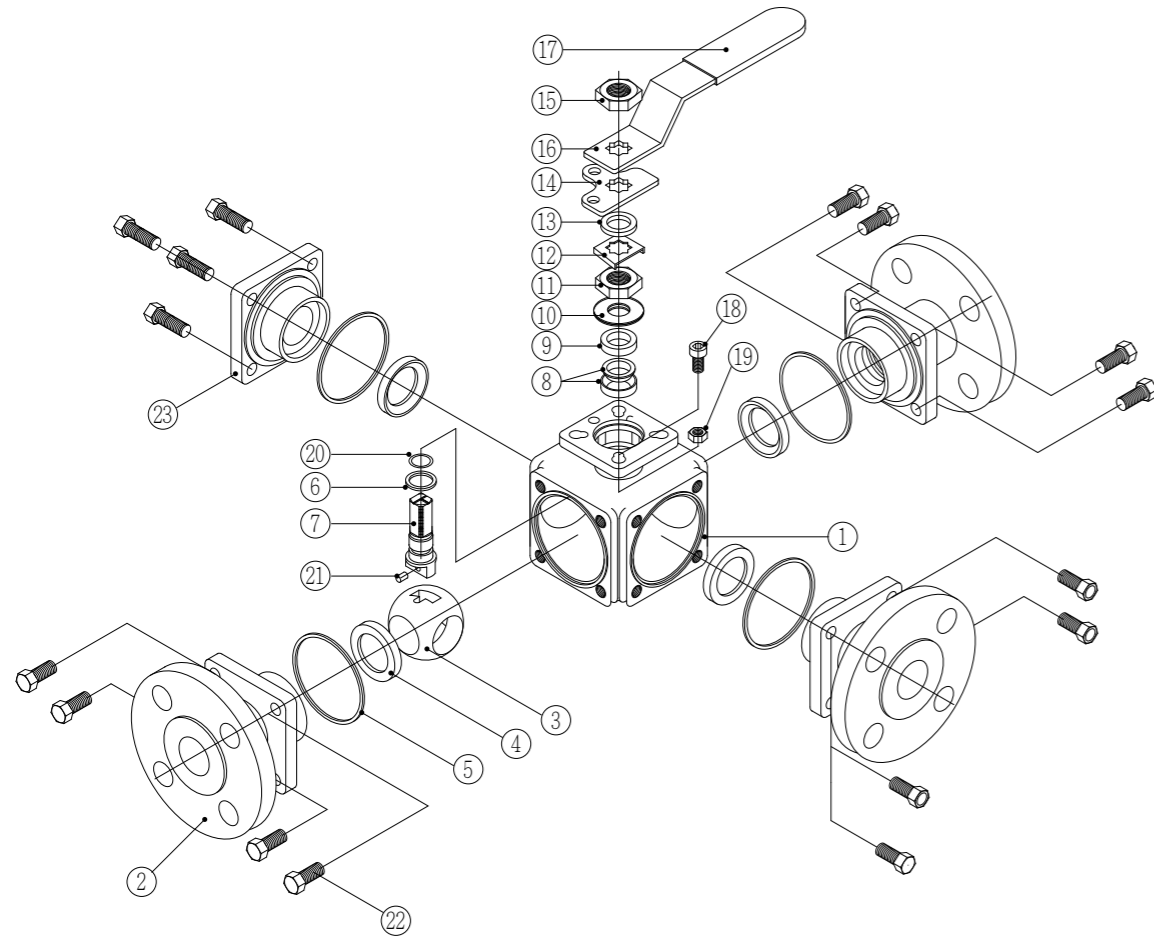
The following table lists the possible malfunctions.

**Table 4.1 Troubleshooting Table**

Symptom	Possible fault	Actions
Leakage through a closed Valve (Internal Leakage)	Damaged ball surface	Replace the ball
	Damaged seats	Replace seats
	Ball might not be fully closed	Realign the ball
Irregular ball movement	Fluid accumulated on the surface.	Flush the ball from inside
	Ball or seat damaged	Clean or replace the ball or seat
Valve leaking from stem (External Leakage)	Stem nut are loosened	Tighten the stem nut
	Parts are worn or damaged	Replace the necessary parts
Valve leaking from body and cap joint (External Leakage)	Damaged or breakage of gasket	Replace gaskets
	Relaxation of studs due to gasket creep	Re-tighten the studs evenly
Valve too hard to operate	Damaged seats	Replace seats
	High pressure	Confirm the pressure rating
	Foreign particles in valve	Clean the internals

### 4.6 Technical Data and Product Information

**M4F(a): DN15~DN50 (1/2"~2")**  
Floating ball with integral top cap design

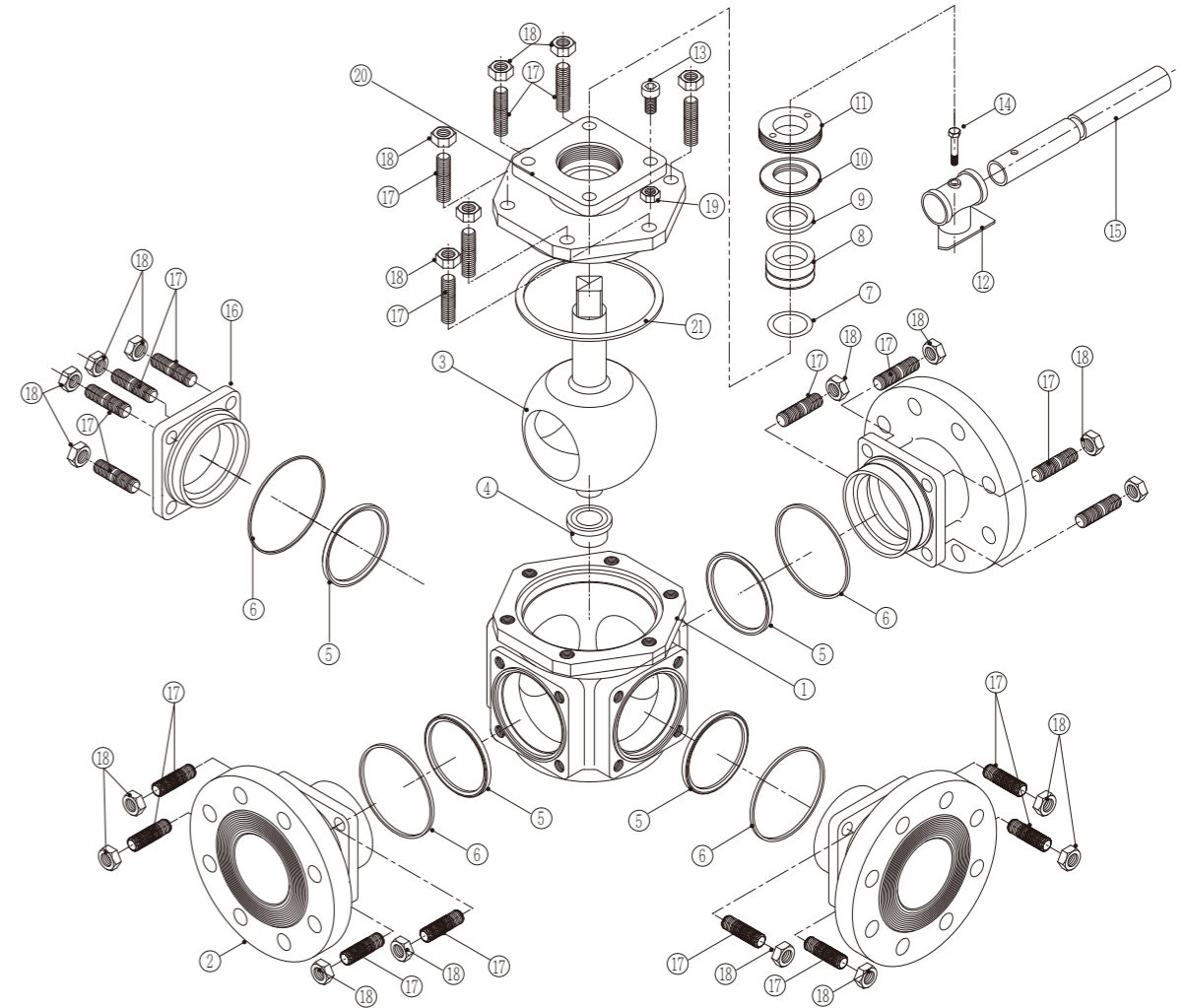


NO	PART NAME	MATERIAL
1	BODY	CF8M
2	END CAP	CF8M
3	BALL	CF8M
4	BALL SEAT	PTFE
5	CAP GASKET	PTFE
6	THRUST WASHER	RTFE
7	STEM	SS316
8	STEM PACKING	TFM
9	GLAND	SS304
10	BELLEVILLE WASHER	SS301
11	STEM NUT	SS304

NO	PART NAME	MATERIAL
12	LOCKING SADDLE	SS304
13	HANDLE WASHER	SS304
14	LOCKING PLATE	SS304
15	HANDLE NUT	SS304
16	HANDLE	SS304
17	HANDLE SLEEVE	VINYL
18	STOP PIN	SS304
19	STOP PIN NUT	SS304
20	O-RING	VITON
21	ANTI-STATIC DEVICE*	SS316
22	CAP BOLT	B8
23	BLANK CAP	CF8M

\* Optional

**M4F(a): DN65~DN100 (2-1/2"~4")**  
Trunnion ball with seperated top cap design

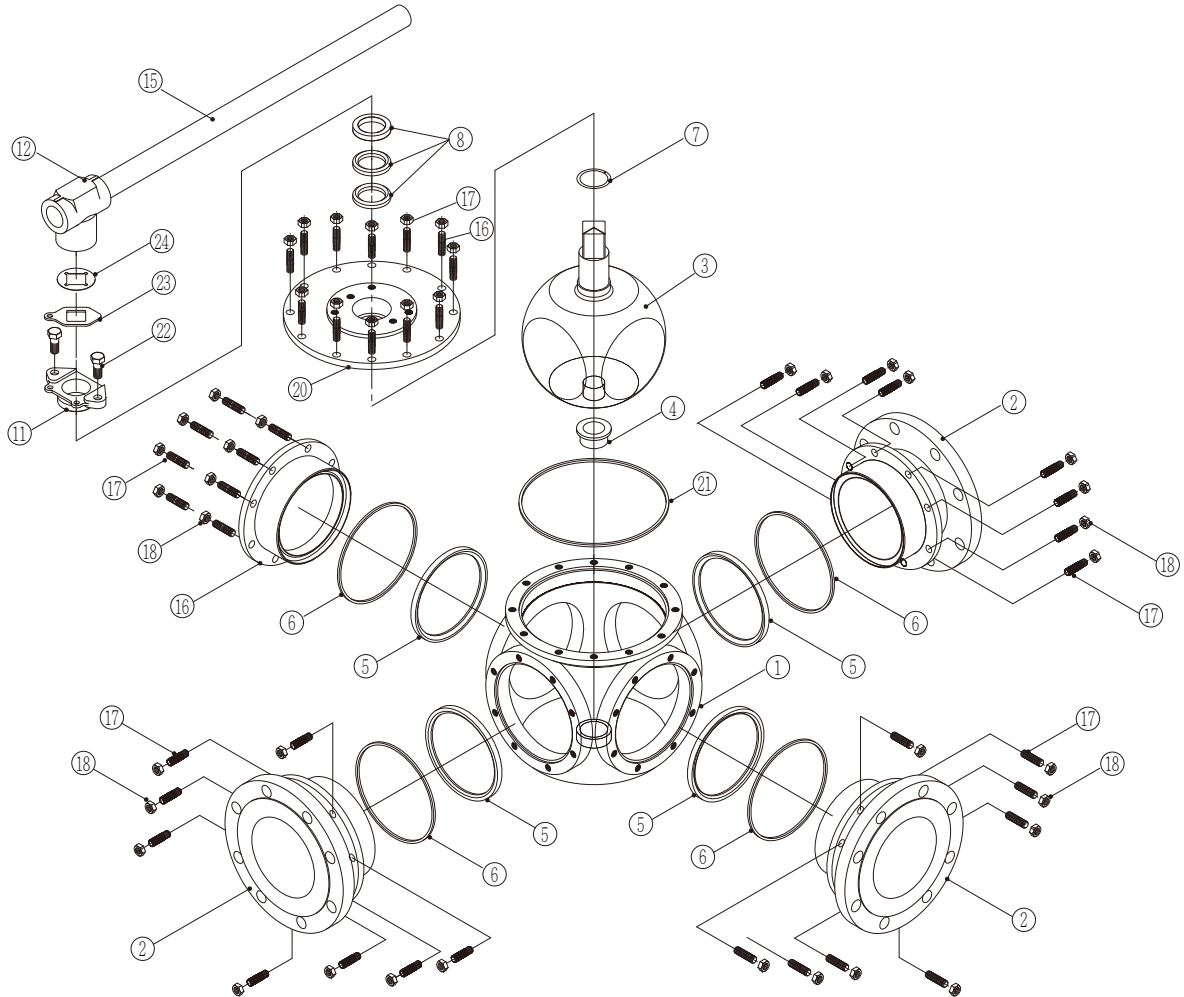


NO	PART NAME	MATERIAL
1	BODY	CF8M
2	END CAP	CF8M
3	TRUNNION BALL	CF8M
4	BALL BUSHING	TFM
5	BALL SEAT	TFM
6	CAP GASKET	TFM
7	O-RING	VITON
8	STEM PACKING	TFM
9	GLAND	SS304
10	BELLEVILLE WASHER	SS301

NO	PART NAME	MATERIAL
11	GLAND PLATE	SS304
12	HANDLE HEAD	CF8
13	STOP BOLT	SS304
14	BOLT	SS304
15	LEVER	CARBON STEEL
16	BLANK CAP	CF8M
17	STUD	SS304
18	CAP NUT/ BONNET NUT	SS304
19	STOP PIN NUT	SS304
20	TOP BONNET	CF8M
21	TOP BONNET GASKET	TFM

## M4F(a): DN125~DN200 (5"~8")

Trunnion ball with seperated top cap design



NO	PART NAME	MATERIAL
1	BODY	CF8M
2	END CAP	CF8M
3	TRUNNION BALL	CF8M
4	BALL BUSHING	PTFE + SS
5	BALL SEAT	PTFE
6	CAP GASKET	PTFE
7	O-RING	VITON
8	STEM PACKING	PTFE
11	GLAND	CF8

NO	PART NAME	MATERIAL
12	HANDLE HEAD	D.I.
15	LEVER	CARBON STEEL
16	BLANK CAP	CF8M
17	STUD	SS304
18	CAP NUT/ BONNET NUT	SS304
20	TOP BONNET	CF8M
21	TOP BONNET GASKET	PTFE
22	GLAND BOLT	SS304
23	STOP PLATE	SS304
24	WASHER	SS304